We claim:

1. An apparatus for investigating a fluid stream containing oil, comprising:

a) an injector which injects an oil fluorescence quenching marker into the oil of the fluid stream at a first location;

b) a light source which subjects the fluid stream to light at a wavelength which will cause the oil in the fluid stream to naturally fluoresce;

c) a fluorescence detection apparatus which detects at a second location a fluorescence signal from the oil in the fluid stream flowing past said second location.

2. An apparatus according to claim 1, wherein:

said quenching marker is chosen from at least one of Europium tris*(2,2,6,6-tetramethyl-3,5-heptanedionate), CH_2I_2, CI_4, CS_2, and CCl_4.

3. An apparatus according to claim 1, wherein:

said quenching marker is a solute dissolved in a solvent.

4. An apparatus according to claim 3, wherein:

at least one of said solute and said solvent deactivates electronically excited states of aromatic molecules in the oil.

5. An apparatus according to claim 3, wherein:

at least one of said solute and said solvent absorbs said light at said wavelength from said light source.

6. An apparatus according to claim 1, further comprising:

d) a processor coupled to said fluorescence detection apparatus, said processor determining a velocity of the oil.

7. An apparatus according to claim 6, wherein:

said injector injects said oil fluorescence quenching marker at a first time,

said fluorescence detection apparatus detects said fluorescence signal over a period of time including a second time after said first time, said second time including a peak in said fluorescence signal indicative of arrival of said oil fluorescence quenching marker, and

said processor determines said velocity by dividing a distance between said first location and said second location by a difference in time from said first time to said second time.

8. An apparatus according to claim 1, wherein:

the oil is flowing in a well having a diameter "D", and said first location and said second location are separated by a distance d which is greater than 10D.

9. An apparatus according to claim 8, wherein:

said distance d is less than 100D.

10. An apparatus according to claim 1, wherein:

said fluorescence detection apparatus comprises an optical probe arranged in the fluid stream, a fiber optic coupled to the probe, an optical filter coupled to said fiber optic, and a fluorescence detector coupled to said optical filter.

11. An apparatus according to claim 10, wherein:

said fluorescence detection apparatus comprises a plurality of optical probes arranged in the fluid stream.

12. An apparatus according to claim 1, wherein said fluid stream is in a well, and wherein:

said injector is located on a logging tool suspended in the well.

13. An apparatus according to claim 12, wherein:

said fluorescence detection apparatus includes an optical probe arranged in the fluid stream and coupled to said logging tool.

14. An apparatus according to claim 12, wherein:

said logging tool includes a spring bow, and

said fluorescence detection apparatus includes a plurality of optical probes arranged in the fluid stream and coupled to said spring bow.

15. An apparatus according to claim 12, wherein:

said light source is coupled to said logging tool.

16. A method for investigating a fluid stream containing oil, comprising:

a) injecting at a first time an oil fluorescence quenching marker into the oil of the fluid stream at a first location;

b) subjecting the fluid stream to light at a wavelength which will cause the oil in the fluid stream to naturally fluoresce;

c) detecting over a period of time at a second location a fluorescence signal from the oil in the fluid stream flowing past said detector, said period of time including a second time when the fluorescence of the oil in the fluid stream is at least partially quenched by said quenching marker.

17. A method according to claim 16, further comprising:

d) determining a velocity of the oil as a function of said first time, said second time, said first location and said second location.

18. A method according to claim 16, wherein:

said quenching marker is chosen from at least one of Europium tris*(2,2,6,6-tetramethyl-3,5-heptanedionate), CH_2I_2, CI_4, CS_2, and CCl_4.

19. A method according to claim 16, wherein:

said quenching marker is a solute dissolved in a solvent.

20. A method according to claim 19, wherein:

at least one of said solute and said solvent deactivates electronically excited states of aromatic molecules in the oil.

21. A method according to claim 19, wherein:

at least one of said solute and said solvent absorbs said light at said wavelength.